gradient

GOLDEN 3

User manual

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USER MANUAL

Please read this manual carefully and keep its contents in mind when using your GOLDEN3 paraglider

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1. INTRODUCTION

Congratulations on buying your new GRADIENT GOLDEN3!

After the worldwide success of the Golden2, Gradient‘s new intermediate glider the Golden3 has been certified EN-B, LTF 1/2.

The Golden3 was designed to be a direct replacement for the Golden2 and in terms of pilot skill it is not any more demanding to fly. The Golden3 is classified as an ‘intermediate’ paraglider (EN-B, LTF 1/2) and is therefore meant for a wide cross-section of pilots: from talented new pilots to time-served experts who, for whatever reason, don‘t fly often and therefore demand not just high performance, but also exceptional safety from their paraglider.

However, the Golden3 is also a completely new wing, the final result of developing and testing several different prototypes. For example, the glider has a new profile, which helps the wing perform better at different angles of attack. And when it comes to handling, the Gradient team has achieved a sensitive, Sports Class characteristic, to give maximum pilot feedback. The Golden3 pilot will find they can react precisely to thermals, the movement of the air and turbulence.

Like all Gradient paragliders the Golden3 has a typical Gradient wing construction. This reduces the glider’s weight, and further improves the wing‘s flying characteristics in extreme manoeuvres, turbulent air and thermals.

We believe that you will love your new glider’s flight characteristics and construction.

This manual provides information which will help you fly safely and keep your wing in good condition. If, after reading this booklet, you have any further questions or uncertainties, please do not hesitate to contact Gradient directly or any authorised Gradient dealer and we will gladly answer all your questions.

When you have become familiar with your Golden3 we would welcome any feedback that you might have about your new paraglider.

2. YOUR PARAGLIDER

2.1. Technical description

- The Golden3 has a new elliptical shape that includes a slightly positive contortion of the leading edge. This means that the „ears“ (stabilo) of the canopy are slightly swept back in flight.

- The Golden3 has a new aerofoil section to achieve the optimal balance between performance and stability. The aerofoil’s characteristics deliver maximum stability over as wide a speed range as possible.

- Special attention has been paid to the position, area and shaping of the cell openings to ensure high stability over a very wide speed range (ie angle of attack). Graduated-sized cell-openings help to increase stability and aid pressure distribution within the glider.

- For better distribution of the forces within the canopy, diagonal segmented-rib technology is used. The forces in the wing are carefully calculated and balanced to give a flawless sail presentation and an intuitive feel to the flying.

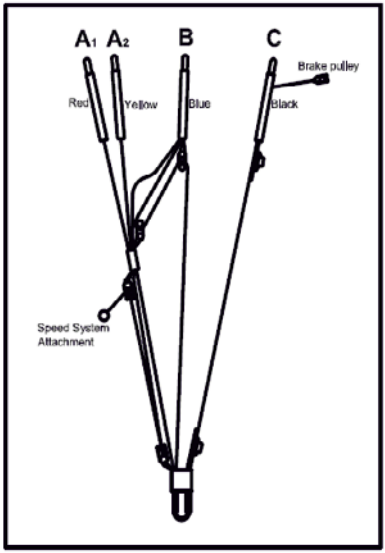
- A special three-level line concept with progressively differing diameters means the top-level lines are made from very strong Dyneema Liros DC. All lines have the advantage of spliced loops giving maximum overall strength, durability and the lowest possible drag.

- Four sets of lines (A, B, C, D) are used for the upper suspension system. The upper C and D lines then combine lower down, so the glider has only three risers. This helps to reduce drag and gives a simple line layout, which pilots will appreciate during pre-flight checks and on launch.

- The main C-lines are connected to the karabiners through loops, allowing for easier adjustment when your glider is serviced.

- The Golden3 is certified to be flown with a foot-operated speed system. The standard speed system comprises two pulleys for each side with a working range of 13 cm (size 28).

Length of the GOLDEN3 risers (mm):			
Size 22	A_1+A_2	B	C
non-accelerated	440	440	440
accelerated	330	350	440
Size 24	A_1+A_2	B	C
non-accelerated	460	460	460
accelerated	340	363	460
Size 26	A_1+A_2	B	C
non-accelerated	480	480	480
accelerated	355	380	480
Size 28, 30	A_1+A_2	B	C
non-accelerated	500	500	500
accelerated	370	395	500



- Gradient has paid attention to details too, including: new low-drag micro attachment points on the wing tips; clearing holes on the wing tips; split A-risers with special karabiners; and a new rucksack, inner bag and riser bag.

2.2. Technical data

Golden3		22	24	26	28	30
Flat Area	[m²]	22.40	24.37	26.54	28.92	31.28
Projected area	[m²]	19.39	21.10	22.98	25.04	27.05
Span	[m]	10.96	11.44	11.88	12.46	12.96
Projected span	[m]	9.19	9.58	10.00	10.44	10.86
Aspect ratio	-	5.37	5.37	5.37	5.37	5.37
Projected aspect ratio	-	4.35	4.35	4.35	4.35	4.35
Max. chord	[m]	2.57	2.68	2.80	2.92	3.04
Min. chord	[m]	0.53	0.56	0.58	0.61	0.63
Number of cells	-	50	50	50	50	50
Line consumption	[m]	313.9	327.5	341.7	356.7	371.0
Weight of the glider	[kg]	4.4	5.0	5.3	5.7	6.1
Take-off weight range*	[kg]	62 - 77	75 - 90	85 - 100	95 - 115	110 - 130
Certification EN / LTF	-	B / 1-2	B / 1-2	B / 1-2	B / 1-2	B / 1-2
Basic speed **	km/h	38	38	38	38	38
Max. speed **	km/h	50+	50+	50+	50+	50+
Min. sink rate **	m/s	1.1	1.1	1.1	1.1	1.1
Glide ratio **	-	8.5+	8.5+	8.5+	8.5+	8.5+

* Take-off weight is the weight of the pilot plus equipment and paraglider (18 kg to 25 kg)

** Performance data are for information only and should not be used as a comparison against other wings

2.2. Materials

Canopy

Upper sail ..... Porcher Marine SKYTEX 9092 E85A-Evolution, 45 g/m²
Porcher Marine SKYTEX 9017 E38A-Classic, 40 g/m²
Bottom sail ..... Porcher Marine SKYTEX 9017 E38A-Classic, 40 g/m²
Ribs ..... Porcher Marine SKYTEX 9017 E29A-Hard finish, 40 g/m²
Reinforcements .. Scrim 180 g/m², Dacron 160 g/m², Laminated PES 60 g/m²
Thread ..... Benar PES

Suspension system

Lines ..... LIROS Dyneema DC 60 / Φ 0.6 mm - strength 68 daN
LIROS Dyneema DC 120 / Φ 0.8 mm - strength 122 daN
Cousin Dyneema Φ 0.95 mm - strength 80 daN
Cousin Dyneema Φ 1.1 mm - strength 100 daN
Cousin Dyneema Φ 1.3 mm - strength 130 daN
Cousin Technora Φ 1.2 mm - strength 110 daN
Cousin Technora Φ 1.5 mm - strength 150 daN

Cousin Technora Φ 1.8 mm - strength 215 daN
Cousin Technora Φ 1.9 mm - strength 300 daN
Risers ..... PAD 1.6 / 22 mm, PAD 1.6 / 15 mm
Thread ..... PAV 9 PAD
Pulleys ..... AustriAlpin Parafly, Riley Australia
Karabiners ..... Maillon Rapide Φ 3.5 mm

3. CERTIFICATION

All sizes of the Golden3 are certified EN B and LTF 1/2.

The certification certificate on your Golden3 is found on a rib in the middle of the canopy. Certification is valid for ABS type harnesses. This type of harness allows a certain degree of adjustment to be made to the length of the chest strap. The recommended distance between the karabiners is 42 cm to 45 cm.

In common with all other paragliders, when looser cross-bracing is used while flying the Golden3, the pilot's weight-shift control is greater. The glider is also more sensitive to movement in the surrounding air. When cross-bracing is tighter, the pilot feels subjectively more stable, but turning by weight-shift is practically ineffectual.

WARNING: *The Golden3 paraglider is only built for hill or tow launching. It is not built to withstand jumping from a plane, balloon, building or for any jumps where there is a belated opening of the canopy.*

4. ADJUSTING YOUR GLIDER

Before it reaches the customer every Golden 3 goes through a final check and test-flight to verify that its characteristics and measurements correspond to the manufacturer's specifications. You may only make adjustments to brake-line lengths or to the speed system of your Golden3 – and only then in keeping with the recommendations of this manual.

Other adjustments or changes to your Golden3 lead to a loss of guarantee, airworthiness and validity of the Certification. Amateur modification may endanger yourself and other pilots. If you do have any suggestions for improvements let us know and our test-pilots will try out your ideas without risk to yourself.

4.1. Brake-line adjustment

When you receive your new Golden3 the brake-line length is adjusted to be the same as that used during the flight tests. This length should suit most pilots and is indicated on the main control line. It is of course possible to **adjust the brake-line**

length to suit each pilot‘s physical build, height of harness hang points, or style of flying. We recommend that you act wisely when adjusting brake-line length and change the length in small, successive steps.

If you need to adjust brakes back to the basic position and the marks on the main brake lines are vague, use the following lengths: Golden3 22: 206 cm; Golden3 24: 216 cm; Golden3 26: 225 cm; Golden3 28: 235 cm; Golden3 30: 245 cm.

Brake lines that are too short may:
1) lead to fatigue from flying with your hands in an unnatural position
2) impede recovery from certain unstable manoeuvres
3) will certainly reduce your glider‘s speed range.

Brakes that are too long will:
a) hamper pilot control during launch
b) reduce control in extreme flying situations
c) make it difficult to execute a good flare when landing.

Each brake line should be tied securely to its control handle. Use knots which will guarantee this, for example, a Double Dragon.

4.2. Addition of speed system

The Golden3 is equipped with a very effective foot-operated speed system as standard. Pressure on the foot stirrup shortens the A and B risers and reduces the angle of attack of the canopy. Thanks to the relative lengths of lines C and D, near the trailing edge, the profile is inclined in a way that preserves the aerodynamic characteristics of the wing. The working range of the speed system pulleys is 13 cm. Make sure you can use the whole of this range when you attach your speed stirrup.

5. OPERATION IN FLIGHT

This manual is intended as a guide to the characteristic features of your new Golden3 paraglider. Under no circumstances should it be used as a „learn-to-fly“ manual for paragliding or as a substitute for a training course.

5.1. Standard flight

5.1.1. Pre-flight check

A thorough pre-flight check is essential for safe flying – pay special attention to it. Above all, you should check that the canopy, lines and risers are free from damage and tangles. Also don‘t forget to check your harness and your reserve parachute.

Before launch spread the canopy out in a slight arc and check that:

- all cell openings are free
- no lines are looped around or under the canopy
- no lines are tangled or have a knot in them
- any twigs, grass or other objects are not tangled in the lines or the canopy
- risers are not twisted
- control lines run freely through the pulleys
- knots on control handles are secure
- karabiners on risers are tightened

5.1.2. Launch

Launching the Golden3 is straightforward, either by forward (Alpine) launch or by reverse launch. A dynamic pull on the front risers (A, coloured red) will bring the canopy simply and easily above the pilot‘s head. The canopy inflates from the centre equally and smoothly. The Golden3 has no tendency to outrun the pilot and quickly stabilises above the pilot. Once there, visually check the canopy and the lines before taking off. Take off can be made easier by a light pull on the brakes.

5.1.3. Flight

The Golden3 is trimmed to fly at best glide when the brakes are fully up. Best sink rate is achieved when both brakes are drawn down evenly to about 20-25% of their range.

Turbulent conditions

When flying through severe turbulence stabilise the canopy by simultaneously applying a little brake to both sides. Flying with a little brake applied will also help to prevent deflations and give you more feedback about what the air is doing and how the glider is reacting. Responding correctly to the paraglider‘s movement by means of the brakes and weight shift is known as „active flying“. A pilot demonstrating good active-flying skills will significantly reduce both the number and severity of collapses he or she experiences.

Turning

The Golden3 is very comfortable and pleasant in turns. Handling characteristics are responsive and accurate and demand no special habits or non-standard procedures. When developing the Golden3 special attention was devoted to the brake pressure. The result is that brake travel and pressure have been optimised. Brake pressure is reassuringly progressive. In flight, brakes are firm but responsive and precise and allow for perfect communication with the canopy. You will find that a harness with fairly loose cross-bracing will help the glider turn. In an emergency (eg a broken brake line) the glider can be steered with the rear risers or by weight shift.

Using the speed system

Maximum speed is one of the strong points of Gradient paragliders and the Golden3 is no exception. Not only has the glider got a very high maximum speed, but unlike some other paragliders the full speed range is useable. In spite of this exceptional stability at high speed don‘t forget that any collapse at full speed will be more severe than the same event experienced at normal trim speed. Always keep both hands on the controls when flying fast in turbulence and be ready to release the speed system immediately at the first sign of a collapse. Use the speed system very carefully or not at all at low altitude.

5.1.4. Landing

Landing the Golden3 is very simple and should offer no difficulty. On your first flights you may be surprised at how well it glides. Take account of this when making your landing approach! Into wind, at about one metre above the ground pull the brakes down all the way. In nil-wind conditions, or if forced to make an emergency landing downwind, you may prefer to take a wrap of each control line to enable a more dynamic flare.

5.2. Rapid descent

Sooner or later every pilot will need to descend quickly. It might be because of a sudden and unexpected change in the weather, reaching cloud base and not wishing to enter cloud, or simply because you need to finish your flight quickly. Additionally, if where you are landing is thermic, it is often very difficult to land without using a rapid descent method. There are three main methods for achieving a rapid descent and they are: Big Ears, B-Line Stall and Spiral Dive.

Practise these manoeuvres under the supervision of an instructor and with a reserve parachute. Never compromise your safety.

5.2.1. Big Ears

This is the easiest technique for a rapid descent. Depending on how much of the wing tip you deflate, 3 m/s to 6 m/s sink rate can be achieved. While in Big Ears your sink rate and forward speed can be further increased by using the speed system. The Golden3 can be steered while Big Ears are in by means of weight shift.

Initiation: Take hold of the outer A-lines on both sides as high as possible and pull them down smoothly. Hold them firmly. The effective area of the glider is reduced equally on both sides of the wing. The size of the deflated area depends on how deeply the lines are pulled down (or on the number of lines pulled – one or two outer lines on both sides). Be sure to pull both sides equally.

Recovery: Under normal circumstances the Golden3 will open automatically when the A-lines are released. Opening may be accelerated by gently pumping the brakes (repeated symmetrical braking on both sides).

5.2.2. B-Line Stall

This is a very effective rapid descent technique. Depending on how far the B-risers are pulled down, the sink rate is between 5 m/s and 10 m/s.

Initiation: Take hold of the B-risers at the top and smoothly pull them down until the canopy shows a span-wise crease where the B-lines attach to the canopy. Your sink rate will increase considerably while your forward speed will decrease to practically zero. Don‘t be startled when the airflow over the top surface is disrupted and the paraglider enters a parachutal stall without moving forward. It will soon stabilise above your head.

Recovery: On releasing the B-risers the Golden3 automatically returns to normal flight without staying in deep stall or surging in front of the pilot. Let go of the risers smoothly and symmetrically.

CAUTION: *Do everything symmetrically and at the same time. If the B-risers are released unevenly the canopy can enter a turn. If the risers are released slowly and very unevenly you could enter a spin.*

5.2.3. Spiral Dive

The Spiral Dive is the most effective way of making a fast descent. Every pilot should be able to perform a spiral dive and one day you may need to. When in a Spiral Dive always stay aware of your altitude, which decreases very rapidly. The sink rate reached in a Spiral Dive can be more than 15 m/s. During the manoeuvre the pilot and glider will experience strong centrifugal forces. Forces of greater than 3G are possible – a great strain on the pilot as well as the glider.

Initiation: Smoothly pull on one brake so that the glider goes from a normal 360-degree turn into a steep turn and from there into a spiral dive. The transition into a spiral dive can be made easier by weight shifting to the inner side of the turn. Keep an eye on the tension of the brakes all the time: reduced tension signals an overload of the glider and danger of falling into a negative spin.

Recovery: The Golden3 recovers from a Spiral Dive automatically as soon as the brakes are released. Release them smoothly and always finish a Spiral Dive with safe altitude!

CAUTION: *When exiting the Spiral Dive make sure your position in the harness is neutral. Recovery from a Spiral Dive can be delayed if you are weight shifting to the inner side of the turn.*

5.3. SIV manoeuvres

No matter what category of canopy you fly or what level of certification it has, in turbulence or in strong thermals you may experience all kinds of collapses. The Golden3 behaves comfortably in these situations. Indeed, not only does the glider deal with extreme flight situations automatically, but it also offers an above-average degree of safety. Even so, you must follow all safety rules when practising SIV. Always pay attention to your altitude.

Before performing any SIV manoeuvre remember:

- Practise throwing your reserve on the ground, in a simulator, so that reserve deployment is efficient and automatic.
- Rapid altitude loss and considerable rotational forces may develop during unstable manoeuvres. Take account of these factors when throwing your reserve.

5.3.1. Asymmetric Collapse – one side of the canopy collapses

Initiation: Take hold of the outer A-lines (outer A-riser) on one side and pull them down smoothly. The wing tip will collapse to form a characteristic Big Ear. The size of the ear depends on the depth to which the lines are pulled as well as the number of lines pulled down. You can stop any turn tendency by applying the opposite brake and by weight shifting onto the inflated side of the canopy.

Recovery: Under normal conditions the Golden3 will re-inflate spontaneously when the pulled lines are released. Inflation time and loss of altitude can be reduced by suitable piloting. To stop any tendency to turn off course pull the brake on the inflated side (be careful not to overreact and stall the inflated side) and weight shift to that side. If the collapse remains then re-inflate the collapsed side by „pumping“ the brake on the collapsed side.

5.3.2. Full Frontal Collapse

Initiation: Take hold of both A-risers at the top and pull them down until the leading edge collapses.

Recovery: In normal conditions the Golden3 will recover normal flight automatically as soon as the front risers are released. Applying the brakes on both sides simultaneously can help re-open the paraglider

5.3.3. Deep Stall

Initiation: Pull both brakes smoothly until the sink rate increases markedly and the forward speed reaches almost zero. The pull on the brakes should be controlled so that the canopy stays inflated and doesn‘t fall back into a full stall.

Recovery: The Golden3 cannot stay in deep stall flight, so after the brakes are released the glider automatically returns to normal flight. If you need to, you can

accelerate recovery by pulling hard on both brakes, followed by a fast release. Or you can pull lightly on the A-risers.

CAUTION: *If you pull too hard on the A-risers you may experience a full frontal collapse.*

5.3.4. Full Stall

Initiation: Wind the control lines once or twice around your hands and pull both of them down smoothly. Hold them down until the canopy falls behind the pilot and deforms into a characteristic crescent shape. Hold your hands firmly (press them underneath the seat) and be careful that you do not release the brakes prematurely or asymmetrically.

Recovery: The Golden3 recovers from a full stall automatically after the brakes are smoothly released. During correct recovery from a full stall the Golden3 shows no extreme tendencies such as a diving in front of the pilot. If the brakes are released prematurely or too quickly there is a possible tendency for the glider to dive ahead of the pilot. This can be corrected by adequate simultaneous braking on both-sides.

CAUTION: *When exiting a Full Stall if the brakes are released asymmetrically the glider may suffer a massive asymmetrical collapse followed by a tendency to enter a spin.*

5.3.5. Negative Spin

Initiation: Slow down by braking to nearly minimum speed. Then pull a brake on one side all the way down while simultaneously releasing the brake on the other side. Because the stalled side falls back, the canopy suffers airflow disruption over one half of the wing which results in a spin and a rapid loss of altitude.

Recovery: Under normal circumstances the Golden3 is capable of recovering from a Negative Spin automatically when the brakes are released.

CAUTION: *In general when there is a very fast or a long-lasting rotation and when the brakes are released too quickly, the canopy may shoot in front of the pilot followed by a massive asymmetrical collapse.*

WARNING: *Whenever a paraglider is not in normal flight and airflow is disrupted there is always a rapid increase in sink rate and therefore a substantial loss of altitude.*

REMEMBER: When practising SIV the wrong manoeuvre at the wrong time may change a fairly easy situation into a dangerous problem. You are also exposing your glider to forces that may damage it. Practise SIV manoeuvres only under the supervision of an instructor and with a reserve parachute.

6. MAINTAINING YOUR GLIDER

If you handle your glider with care and store it in a suitable place it can last you a very long time. On the other hand, neglecting maintenance, bad storage and the use of unsuitable cleaning products can reduce the lifespan of your glider significantly or may even make it dangerous.

You must keep to these rules:

- Choose a suitable area for your launches. Lines caught on roots or rocks lead to unnecessary strain on the attachment tabs during inflation. Snagging lines may rip the canopy tissue or damage lines.
- When landing, **never let the canopy fall on its leading edge** in front of the pilot. The effect of these forceful collisions and the sudden pressure increase can severely damage the air-resistant coating of the canopy as well as weaken the ribs and seams.
- Protect the canopy from unnecessary strain. Inconsiderate handling of your glider – pulling it over grass, soil, sand or rocks – will significantly reduce its lifetime and increase its air-porosity.
- When preparing the paraglider for a launch or when ground handling, be sure not to step on any of the lines or the canopy.
- Don‘t tie any unnecessary knots in the lines. Packing methods where special knots are made in the lines as used on parachutes and reserve parachutes are not suitable for packing the lines used on paragliders.
- Protect your canopy and lines from unnecessary exposure to sunlight. UV-rays can damage many parts of a paraglider.
- Try **not to pack your glider when wet.** If it’s unavoidable then dry it as soon as possible but away from direct sunlight. **Be careful to avoid storing your canopy wet** – this is the most common reason for cloth degradation, and is easily preventable.
- Don‘t let your glider come into contact with seawater. If it does, rinse the lines, canopy and risers with fresh water and dry before storing.
- After flight or when storing always use the inner protection sack.
- When storing or during transport make sure your glider isn‘t exposed to temperatures higher than 50 degrees Celsius.
- Never let the paraglider come into contact with chemicals. Clean the glider with clean lukewarm water only.

- For long-term storage don‘t pack the glider too tightly. Store it in a cold, dry and well-ventilated room.

- After tree- or water-landings always examine the glider carefully. If you suspect that the flight features of your paraglider have changed, contact an authorised Gradient supplier as soon as possible.

- After 200 flying hours or two years your Golden3 must be thoroughly checked and tested by the manufacturer or by an authorised service centre.

7. REPAIRING YOUR GLIDER

Only small repairs – ie repairs that don‘t change the airworthiness of the paraglider – may be done by the user. These include: fixing small tears (but not seams) up to 10 cm; changing damaged lines; and changing rubber line-fixation rings on the small karabiners.

When repairing your paraglider on your own follow these rules:

- When repairing the sail use a self-adhesive patch specified for this purpose. Every Golden3 comes with a small amount of self-adhesive material which is enough for small repairs.

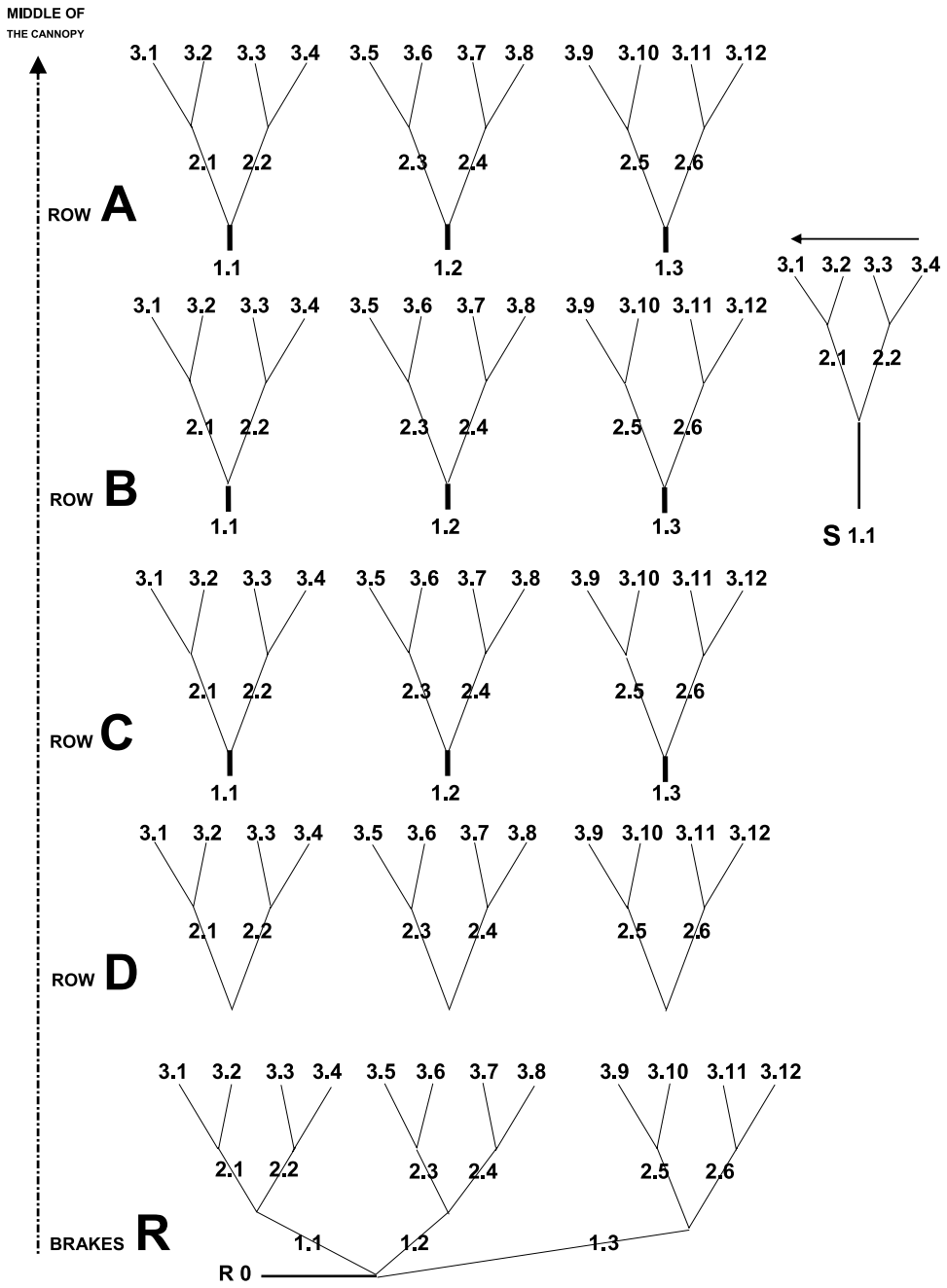
- The only admissible repairs done on lines are those where the damaged lines are changed for new ones. Lines must be exclusively supplied by Gradient, an authorised dealer or authorised service centre. When ordering new lines use the codes in the attached line diagram. Use the code “G3” (Golden3) and tell us the size your glider, ie ‘G3 24’, ‘G3 26’, ‘G3 28’, ‘G3 30’ followed by the line code. For example, the outside long line in row A for a Golden3 28 is: ‘G3 28 A 1.3.’

- An exception to this is an emergency repair while out flying. For this purpose Gradient encloses a spare line with every Golden3 with a prepared loop on one end. To get the right length adjust it according to the same line on the opposite side of the canopy and then, if necessary, attach your brake handle. As soon as you can, change the line for an original one from your authorised Gradient service centre.

- After changing any lines a thorough pre-flight check must be done. Don‘t hesitate to ask your instructor or an experienced colleague for help. If you‘re not sure, entrust the job to either the manufacturer or an authorised Gradient dealer.

- If you have to replace any of the line-tidy rings (a spare ring is supplied with each Golden3) check that the lines haven‘t been swapped accidentally and that they are returned to the small karabiner in the correct order.

Gradient Golden3 - Line Map



8. ENJOY YOUR FLYING

Even though the Golden3 has outstanding performance and stability it must be understood that even the safest paraglider is an aircraft and that all air sports can be relatively dangerous.

Remember that your safety lies in your own hands and that „lucky pilots are well prepared pilots“.

Never underestimate weather conditions. And never forget that you are flying for pleasure and not to become a ‘fallen hero’. Remember this and the fun that only free-flying can bring will be yours.

We believe that your sensible attitude and the flight characteristics of your Golden3 will combine to ensure you have many hours of fantastic flying.

GRADIENT wishes you many fabulous flights and happy landings.

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Trust the adventure

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